TEXAS AGRICULTURAL EXPERIMENT STATION

BULLETIN NO. 27

JUNE, 1893.

STEER FEEDING.

(LIST OF PUBLICATIONS TO DATE)

Agricultural and Mechanical College of Texas.

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TEXAS AGRICULTURAL EXPERIMENT STATION.

STEER FEEDING.*

J. H. CONNELL, M. Sc.

J. W. CARSON, B. Sc.

The practice of feeding boiled cotton seed to both dairy and beef cattle has long been in vogue, but the feeding of roasted cotton seed is of much more recent date.

The discovery of some method of preparation by which cotton seed could be most successfully employed as a feed stuff has long been desired.

In answer to numerous letters of inquiry from many interested in the feeding of cattle and seeking aid from this station, this experiment has been undertaken in the hope of discovering a preparation at once, cheap and so palatable as to be readily consumed by stock in such quantities as to result in the greatest possible increase in flesh in the shortest possible time.

First: In this experiment, a test is made of the relative feeding values of cotton seed, roasted, boiled and raw.

Second: Also to compare cotton seed, corn and hay, rations with a ration of corn and hay only.

Third: To test a ration of cotton seed meal, hulls and silage with the other rations fed.

STEERS FED.

For conducting this test a lot of twenty native steers was purchased in the month of February, 1892, and are known as "Lot A." These steers were each coming two years old in the spring, and though very thin in flesh were carefully selected with reference to evenness in size, weight and general feeding qualities reducing individual variation to the minimum. They were dehorned and fed in groups of four under shelter in pens measuring 10x14 feet opening into an outside enclosure 20x32 feet. Each pen was given a ten days preliminary feeding, in order to accustom them to the food before the weights were taken, and the average of three daily weighings was taken to represent the weight of each steer at the beginning of the experiment.

In order to arrive at the most accurate conclusions possible another test was planned and these steers, "Lot A" at the termination of the fifty days feeding were put to pasture and used again the following winter in making a duplicate test. When fed the second winter they are known as "Lot A. A." to distinguish them from another bunch of 20 steers, which were fed at the same time and known as "Lot B."

* This experiment was planned and conducted by Prof. G. W. Curtis and was to have been edited by him. In his absence Mr. J. W. Carson has written up the results of the work, assisted by the director.

Lot A fed (March 2d, to April 20th, 1892) 50 days.
Lot A. A. fed (December 1st, 1892 to March 10th, 1893) 100 days.
Lot B. fed (December 1st, 1892 to March 10th, 1893) 100 days.

Lot B consisted of twenty native steers coming three years old in the spring and averaging slightly younger than those of "Lot A". They were purchased just before the second test was begun and were immediatly dehorned. The first "Lot A" (fed the preceding spring) was in much better condition as to flesh than was Lot B.; in which all were thin but apparently in good health.

These steers of "Lot A. A." having been tagged the previous spring were grouped exactly as in first experiment and were fed on same rations as before.

In grouping the steers of "Lot B." the same care was exercised to secure uniformity of size, general similarity and equality of individual as in arranging "Lot A." They were placed in pens of four, as were those used in the first experiment, and were fed in the same manner on the same rations. All were given ten days preliminary feeding, and the average of three daily weighings was taken as the weight of the steers at the beginning, exactly as was done in the first test. Thus a *triplicate* test was made of the feeding value of rations fed in the first experiment.

WEIGHINGS.

In order to keep informed as to the condition and general improvement of each animal, weighings were made every ten days and at these weighings, as also in the case of the preliminary weighings, steers in each pen were as near as possible under similar circumstances each time. Water was withheld the night previous to weighing, and they were weighed immediately after feeding in the morning and before watering.

THE FOOD USED.

They were fed morning and evening of each day, food given was accurately weighed, and unconsumed remainder, if any, removed daily. Salt was given twice each week and water was constantly before them.

The hay used in all of the tests was a poor quality of prairie hay, valued at $6.00 per ton. The corn was ground in the ear and fed as corn and cob chops, valued at 40 cents per bushel in the ear. The silage fed was pure corn silage cut and put into silo at the ordinary stage, too hard for roasting ears.

Weights of *roasted* and *boiled* cotton seed are given in tables from the dry raw seed, which were treated and fed after being weighed.

*COST OF ROASTING SEED PER TON.

"A man who understands his business will roast 800 pounds per day with one of Greene's $30.00 roasters. An expert hand will possibly increase this amount to 1000 pounds, but 800 pounds will be found above the average, estimating his services at $1.00 per day, we have the following:

Cost of labor to roast one ton of seed	$2.50.
Wear and tear and interest on investment	.25.
Cost of fuel	.25.
Total cost of roasting one ton of cotton seed	$3.00.

* This statement is taken from Bulletin No. 21

COST OF BOILING SEED PER TON.

A man who understands his business will readily attend the boiler while performing his regular work about the barn and scarcely miss the time; allowing, however, actual time demanded in filling, stirring and emptying boiler, at estimated price of $1.00 per day including board we have the following:

Cost of labor to boil one ton of seed	$1.50.
Wear and tear and interest on investment	.25.
Cost of fuel	.25.
Total cost of boiling one ton of cotton seed	$2.00."

Estimating raw seed at a valuation of $7.00 per ton we obtain our valuations given in the tables, viz:

Boiled seed $9.00 per ton, roasted seed $10.00 per ton.

COST OF FOOD STUFFS.

In order to preserve a general uniformity that would assist in making accurate and easy comparisons with other feeding experiments at this station, the prices affixed to feed stuffs are the same as those given in previous experiments.

It will be noted that cotton seed boiled is rated at $2.00 and roasted seed $3.00 per ton higher than raw seed to cover the actual cost of preparation. It will also be noted that a table appears, in which the cost of food is calculated at a higher rate than that before used to indicate present market values. See page 320.

The following statements are conveniently arranged to show for each pen the total cost of food consumed, average weight of steers at beginning of test, average gain per head, gain per cwt. and cost of food per pound gained:

STATEMENT NO. 1. LOT A.

PEN NO. 1. FOUR STEERS.

Consumed per head in fifty days:	
208 pounds cotton seed meal at $20.00 per ton	$2.08.
560 pounds cotton seed hulls at $3.00 per ton	.84.
558 pounds silage at $2 per ton	.56.
Total cost of food consumed	$3.48.
2 Average weight of steers	462 pounds.
3 Average gain per head	118 pounds.
4 Gain Per cwt	27 7-10 pounds.
5 Cost of food for each pound gained	2.94 cents.

PEN NO. 2. FOUR STEERS.

Consumed per head in fifty days:	
231 pounds corn at 40 cents per bushel	$1.28.
338 pounds *roasted* cotton seed at $10.00 per ton	1.69.
148 pounds hay at $6.00 per ton	.45.
1 Total cost of food consumed	$3.42.
2 Average weight of steers	462 pounds.
3 Average gain per head	131 pounds.
4 Gain per cwt	30.4 pounds.
5 Cost of food for each pound gained	2.61 cents.

PEN NO. 3. FOUR STEERS.

Consumed per head in fifty days:

227 pounds of corn at 40 cents per bushel	$1.26.
383 pounds boiled cotton seed at $9.00 per ton	1.72.
143 pounds of hay at $6.00 per ton	.42.
1 Total cost of food consumed	$3.40.
2 Average weight of steers	435 pounds.
3 Average gain per head	136 pounds.
4 Gain per cwt	31.2 pounds.
5 Cost of food consumed for each pound gained	2.51 cents.

PEN NO. 4. FOUR STEERS.

Consumed per head in fifty days.

226 pounds corn at 40 cents per bushel	$1.29
254 pounds raw cotton seed at $7.00 per ton	.68
213 pounds hay at $6.00 per ton	.64
1 Total cost of food consumed	$2.79
2 Average weight of steers	413 pounds.
3 Average gain per head	118 pounds.
4 Gain per cwt	28½ pounds.
5 Cost of food for each pound gained	2.36 cents.

PEN NO. 5. FOUR STEERS.

Consumed per head in fifty days.

381 pounds corn at 40 cents per bushel	$2.11
238 pounds hay at $6.00 per ton	.71
1 Total cost of food consumed	$2.82
2 Average weight of steers	440 pounds.
3 Average gain per head	118 pounds.
4 Gain per cwt	17.2 pounds.
5 Cost of food consumed for each pound gained	3.71 cents.

STATEMENT NO. 2. LOT A. A.

PEN NO. 1. FOUR STEERS.

Consumed per head in 100 days.

497.5 pounds cotton seed meal at $20.00 per ton	$4.97.
722 pounds cotton seed hulls at $3.00 per ton	1.08.
1997 pounds silage at $2.00 per ton	1.99.
1 Total cost of food consumed	$8.04.
2 Average weight of steers	638 pounds.
3 Average gain per head	76 pounds.
4 Gain per cwt	29.1 pounds.
5 Cost of food for each pound gained	4.32 cents.

PEN NO. 2. FOUR STEERS.

Consumed per head in 100 days.

525 pounds of corn at 40 cents per bushel	$2.91.
641 pounds cotton seed (roasted) at $10.00 per ton	3.20.
430 pounds of hay at $6.00 per ton	1.29.
1 Total cost of food consumed	$7.40.
2 Average weight of steers	625 pounds.
3 Average gain per head	199 pounds.
4 Gain per cwt	31.8 pounds.
5 Cost of food for each pound gained	3.72 cents.

PEN NO. 3. FOUR STEERS.

Consumed per head in 100 days.

530 pounds corn at 40 cents per bushel	$2.94.
771 pounds cotton seed (boiled) at $9.00 per ton	3.47.
416 pounds hay at $6.00 per ton	1.25.
1 Total cost of food consumed	$7.66.
2 Average weight of steers	630 pounds.
3 Average gain per head	207 pounds.
4 Gain per cwt	32.8 pounds.
5 Cost of food for each pound gained	3.7 cents.

PEN NO. 4. FOUR STEERS.

Consumed per head in 100 days.

530 pounds corn at 40 cents per bushel	$2.94.
516 pounds raw cotton seed [at $7 per ton]	1.80.
530 pounds hay at $6.00 per ton	1.59.
1 Total cost of food consumed	$6.33.
2 Average weight of steers	576 pounds.
3 Average gain per head	192 pounds.
4 Gain per cwt	33.3 pounds.
5 Cost of food for each pound gained	3.29 cents.

PEN NO. 5. FOUR STEERS.

Consumed per head in 100 days.

1409 pounds corn at 40 cents per bushel	$7.80.
753 pounds hay at $6.00 per ton	2.25.
1 Total cost of food consumed	$10.05
2 Average weight of steers	615 pounds.
3 Average gain per head	203 pounds.
4 Gain per cwt	33 pounds.
5 Cost of food for each pound gained	4.95 cents.

STATEMENT NO. 3, LOT B.

PEN NO. 1. FOUR STEERS.

Consumed per head in 100 days.

491 pounds cotton seed meal at $20.00 per ton	$4.91.
670 pounds cotton seed hulls [at $3 per ton]	1.00.
1897 pounds silage at $2.00 per ton	1.90.
1 Total cost of food consumed	$7.81.
2 Average weight of steers	513 pounds.
3 Average gain per head	266 pounds.
4 Gain per cwt	52.04 pounds.
5 Cost of food for each pound gained	2.99 cents.

PEN NO. 2. FOUR STEERS.

Consumed per head in 100 days.

508 pounds corn at 40 cents per bushel	$2.82.
692 pounds cotton seed (roasted) at $10.00 per ton	3.46.
350 pounds hay at $6.00 per cwt	1.05.
1 Total cost of food consumed	$7.33.
2 Average weight of steers	513 pounds.
3 Average gain per head	222 pounds.
4 Gain per cwt	43.27 pounds.
5 Cost of food for each pound gained	3.53 cents.

PEN NO. 3. FOUR STEERS.

Consumed per head in 100 days.

519 pounds corn at 40 cents per bushel	$2.88.
819 pounds cotton seed (boiled) at $9.00 per ton	3.68.
286 pounds hay at $6.00 per ton	.75.
1 Total cost of food consumed	$7.31.
2 Average weight of steers	509 pounds
3 Average gain per head	223 pounds.
4 Gain per cwt	43.8 pounds.
5 Cost of food for each pound gained	3.27 cents.

PEN NO. 4. FOUR STEERS.

Consumed per head in 100 days.

512 pounds corn at 40 cents per bushel	$2.84.
606 pounds raw cotton seed at $7.00 per ton	2.12.
322 pounds hay at $6.00 per ton	.96.
1 Total cost of food consumed	$5.92.
2 Average weight of steers	511 pounds.
Average gain per head	208 pounds.
4 Gain per cwt	40.7 pounds.
5 Cost of food for each pound gained	2.84 cents.

PEN NO. 5. FOUR STEERS.

Consumed per head in 100 days.

1466 pounds corn at 40 cents per bushel	$8.14.
357 pounds hay at $6.00 per ton	1.07.
1 Total cost of food consumed	$9.21.
2 Average weight of steers	522 pounds.
3 Average gain per head	193 pounds.
4 Gain per cwt	36.9 pounds.
5 Cost of food for each pound gained	4.77 cents.

For easy reference and comparison of results we give the following summaries:

SUMMARY NO. 1.

LOT "A"—FED 50 DAYS—MARCH 2 TO APRIL 20, 1893.

No. of Pen	Average weight of Steers at Beginning	Average Gain Per Head	Gain Per Day	Gain Per cwt.	Cost of Food Per Pound Gained	Cost of Food Per Head	RATION FED 50 DAYS.
	POUNDS	POUNDS	POUNDS	POUNDS	CENTS	DOLLARS	
1	462	118	2 36	27 7	2 94	3 48	Cotton Seed Meal, Hulls and Silage.
2	431	131	2 62	30 4	2 61	3 42	Roasted Cotton Seed, Corn and Hay.
3	435	136	2 72	31 2	2 51	3 40	Boiled Cotton seed, Corn and Hay.
4	413	118	2 36	28 5	2 36	2 79	Raw Cotton Seed, Corn and Hay.
5	440	76	1 52	17 2	3 71	2 82	Corn and Hay.

From this Table we have the following results:

(a) The cheapest pound gained was by Pen 4; second, Pen 3.
(b) The dearest pound gained was by Pen 5; second, Pen 1.
(c) The cheapest feed per day was fed Pen 4; second, Pen 5.
(d) The dearest feed per day was fed Pen 1; second, Pen 2.
(e) The greatest gain was made by Pen 3; second, Pen 2.
(f) The least gain was made by Pen 5; second, Pen 1.

SUMMARY NO. 2.

LOT "AA,"—FED 100 DAYS—DECEMBER 1, 1892, TO MARCH 10, 1893.

No. of Pen	Average weight of Steers at Beginning	Average Gain Per Head	Gain Per Day	Gain Per cwt.	Cost of Food Per Pound Gained	Cost of Food Per Head	RATION FED 100 DAYS.
	POUNDS	POUNDS	POUNDS	POUNDS	CENTS	DOLLARS	
1	638	186	1 86	29 1	4 32	8 05	Cotton Seed Meal, Hulls and Silage.
2	625	199	1 99	31 8	3 71	7 40	Roasted Cotton Seed, Corn and Hay.
3	630	207	2 07	32 8	3 70	7 66	Boiled Cotton Seed, Corn and Hay.
4	576	192	1 92	33 3	3 29	6 33	Raw Cotton Seed, Corn and Hay.
5	615	203	2 03	33	4 95	10 05	Corn and Hay.

From this Table we have the following results:

(a) The cheapest pound gained was made by Pen 4; second Pen 3.
(b) The dearest pound gained was made by Pen 5; second, Pen 1.
(c) The cheapest feed per day was fed Pen 4; second, Pen 2.
(d) The dearest feed per day was fed Pen 5; second, Pen 1.
(e) The greatest gain was made by Pen 3; second, Pen 5.
(f) The least gain was made by Pen 1; second, Pen 4.

SUMMARY NO 3.

LOT "B," FED 100 DAYS—DECEMBER 1, 1892, TO MARCH 10, 1893.

No. of Pen	Average weight of Steers at Beginning	Average Gain Per Head	Gain Per Day	Gain Per cwt.	Cost of Food Per Pound Gained	Cost of Food Per Head	RATION FED 100 DAYS.
	POUNDS	POUNDS	POUNDS	POUNDS	CENTS	DOLLARS	
1	513	266	2 66	52 04	2 99	7 81	Cotton Seed Meal, Hulls and Silage.
2	513	222	2 22	43 3	3 3	7 33	Roasted Cotton Seed, Corn and Hay.
3	509	223	2 23	43 8	3 27	7 31	Boiled Cotton Seed, Corn and Hay.
4	511	208	2 08	40 7	2 84	5 92	Raw Cotton Seed, Corn and Hay.
5	522	193	1 93	36 9	4 77	9 21	Corn and Hay.

From this Table we have the following results:

(a) The cheapest pound gained was made by Pen 4; second, Pen 1.
(b) The dearest pound gained was made by Pen 5; second, Pen 2.
(c) The cheapest feed per day was fed Pen 4; second, Pen 3.
(d) The dearest feed per day was fed Pen 5; second, Pen 1.
(e) The greatest gain was made by Pen 1; second, Pen 3.
(f) The least gain was made by Pen 5; second, Pen 4.

TABLE NO. 1

SHOWING GAIN PER CWT. FOR ALL STEERS FED. (Given in Pounds.)

No. Pen	FOOD EATEN.	Summary No. 1. 50 days	Summary No. 2. 100 Days	Summary No. 3. 100 Days
1	Cotton Seed Meal, Hulls and Silage	27 70	29 10*	52
2	Roasted Seed, Corn and Hay.	30 40	31 8	43 2
3	Boiled Seed, Corn and Hay.	31 20	32 8	43 8
4	Raw Seed Corn and Hay.	28 50	33 3	40 7
5	Corn and Hay.	17 20	33 00	36 9

TABLE NO. 2

SHOWING COST OF FOOD PER HEAD FOR ALL STEERS FED. (Given in Dollars and Cents.)

No. Pen	FOOD EATEN.	Summary No. 1. 50 Days.	Summary No. 2. 100 Days.	Summary No. 3. 100 Days.
1	Cotton Seed Meal, Hulls and Silage	$ 3 48	$ 8 05*	$ 7 81
2	Roasted Seed, Corn and Hay.	3 42	7 40	7 33
3	Boiled Seed, Corn and Hay.	3 40	7 66	7 31
4	Raw Seed, Corn and Hay.	4 79	6 33	5 92
5	Corn and Hay	2 82	10 05	9 21

TABLE NO 3

SHOWING RELATIVE COST PER POUND GAIN FOR ALL STEERS FED. (Given in Cents.)

No. Pen	FOOD EATEN.	Summary No. 1 50 Days.	Summary No. 2 100 Days.	Summary No. 3 100 Days.	Average
		CENTS	CENTS	CENTS	
1	Cotton Seed Meal, Hulls and Silage	2 94	4 32*	2 99	3 42
2	Roasted Seed, Corn and Hay.	2 61	3 71	3 30	3 21
3	Boiled Seed, Corn and Hay.	2 51	3 70	3 27	3 16
4	Raw Seed, Corn and Hay.	2 36	3 29	2 84	2 83
5	Corn and Hay.	3 71	4 95	4 77	4 48

*One steer in this pen was "hipped" and failed to make gain for thirty days.

TABLE NO. 4

SHOWING COST PER POUND GAIN FOR ALL STEERS FED WHEN RAW COTTON SEED IS VALUED AT $10.00 PER TON.

No. Pen	FOOD EATEN.	Summary No. 1 50 Days.	Summary No. 2 100 Days.	Summary No. 3 100 Days.	Average
		CENTS	CENTS	CENTS	CENTS
1	Cotton Seed Meal, Hulls and Silage	2.94	4.32*	2.99	3.42
2	Roasted Seed, Corn and Hay.	3.00	3.76	3.63	3.46
3	Boiled Seed, Corn and Hay.	2.92	4.03	3.82	3.59
4	Raw Seed, Corn and Hay.	2.68	3.70	3.28	3.22
5	Corn and Hay.	3.81	4.95	4.77	4.57

CONCLUSIONS.

As a result of this series of experiments we conclude that:

First: Roasted cotton seed do not have the laxative qualities of Raw Seed and are more palatable.

Second: Faster gains are made by feeding the Boiled Seed, but at a greater cost per pound gain.

Third: The advantages to be gained in the use of Roasted Seed hardly justifies its general use.

Fourth: Boiled Seed are more palatable than Raw Seed, less laxative and make faster gains. May continue to be used with profit.

Fifth: Steers fed on raw seed, eating a less quantity of seed, ate slightly more hay in consequence.

Sixth: Cotton Seed, at usual prices, is a good and cheap addition to a corn and hay ration.

Seventh: The best beef ration found by previous experiments—Cotton Seed, Meal, Hulls and Silage is not here proven the best, when calculated at former prices—Raw Seed, Corn and Hay being better. (See table 3, page 320.)

Eighth: When value of Raw Seed is raised to near market present prices, ten dollars per ton, the Meal, Hulls and Silage is again the best ration; (See bulletin 10, page 28) Raw Seed, Corn and Hay being next best.

Ninth: The average cost of gain per pound in all Lots at present price of foods was 3.64 cents.

Tenth: The cheapest feed per pound gained for all steers fed, when raw cotton seed is valued at $10.00 per ton, was raw seed, corn and hay.

LIST OF PUBLICATIONS TO MARCH, 1893.

Bulletins issued since receiving benefit of Hatch Fund.

Mailed Free on Application.

BULLETIN NO. 1. March, 1888.—Plan of organization. (A number on hand.)

BULLETIN NO. 2. May, 1888.—Cattle feeding; value of cob and shuck in feeding corn, cob and shuck ground together. Analyses of food-stuffs and fertilizers. Statements of Director, Horticulturist and Meteorologist. (A number on hand.)

BULLETIN NO. 3. October, 1888.—Grasses and forage plants; descriptive notes. (Edition exhausted.)

BULLETIN NO. 4. December, 1888.—Root rot of cotton, or "Cotton blight;" preliminary Bulletin. (Edition exhausted.)

BULLETIN NO. 5. March, 1889.—Creameries for Texas; plans and specifications in full for cheap and effective creamery building and outfit. Some points in butter making. (A number on hand.)

BULLETIN NO. 6. June, 1889.—Cattle feeding; effects of dehorning, shelter and different rations. Analyses of ensilage. (A number on hand.)

BULLETIN NO. 7. November, 1889.—Cotton root rot (cotton blight), concluded from Bulletin No. 4. (A large number on hand,)

BULLETIN NO. 8. December, 1889.—Diseases of grapes. Notes on varieties: grapes, strawberries, blackberries and grasses. Best varieties of fruits for the different sections of the state. List of fruits grown on Experiment Grounds. (A large number on hand.)

BULLETIN NO. 9. May, 1890.—Pear stocks. Illustrations showing manner of growth and union of scion and stock. Some parasitic fungi of Texas. (Edition exhausted.)

BULLETIN NO. 10. May, 1890.—Cattle feeding; comparison of different rations for profitable feeding. Continuation of the work reported in No. 6. (A number yet on hand.)

BULLETIN NO. 11. August, 1890.—Effect of cotton seed and cotton seed meal on butter product. Quality of sweet cream butter as compared with butter made from acid cream. (Edition exhausted.)

BULLETIN NO. 12. September, 1890.—The screw worm; life-history, description and illustrations of the insect in all stages, and treatment for wounds. (A number on hand.)

BULLETIN NO. 13. December, 1890.—Sorghum for forage; digestibility, different varieties, analyses at different stages of growth, etc. Teosinte. Miscellaneous analyses. (A number on hand.)

BULLETIN NO. 14. March, 1891.—Effect of cotton seed and cotton seed meal in the dairy ration on gravity and centrifugal creaming of milk. (A number on hand.)

BULLETIN NO. 15. May, 1891.—Influence of climate on composition of corn. Digestibility of Southern food-stuffs, as cotton seed hulls and corn fodder. Analyses of ash and of roasted cotton seed. (Edition exhausted.)

BULLETIN NO. 16. June, 1891.—Drainage experiments with cabbage, Irish potatoes, and strawberries. Forest trees succeeding in this section of the state. (Edition exhausted.)

BULLETIN NO. 17. August, 1891.—General information. Laws authorizing establishment. Organization and officers: Results to date. Inventory of property. (A large number on hand.)

BULLETIN NO. 18. October, 1891.—Liver Flukes. The common fluke; a new species. Life history and treatment. Preventive measures. (A limited number on hand.)

BULLETIN NO. 19. December, 1891.—Corn Fodder; methods of saving; cost: Digestibility and value. Economic study of corn fodder. (A limited number on hand.)

BULLETIN NO. 20. March, 1892.—Grasses and Forage Plants. A study of composition and value. Texas grains discussed from scientific and economic stand-points, showing ash analyses of grasses and grains. (A number on hand.)

BULLETIN NO. 21. June, 1892.—Effect of cotton seed and cotton seed meal in feeding hogs. Their value as food stuffs. Causes of death from cotton seed. Report of Veterinarian. (A number on hand.)

BULLETIN NO. 22. September, 1892.—Alfalfa Root Rot. Report of correspondents, and methods for remedy discussed. (A large number on hand.)

BULLETIN NO. 23. November, 1892.—Black Rot of the Grape; life history; treatment. Plates of the disease; (magnified); applications used in treatment. (A large number on hand.)

BULLETIN NO. 24. December, 1892.—The Cattle Tick. Biology: Preventive measures. Plates showing male and female. Ticks as factors in Texas fever. (A large number on hand.)

BULLETIN NO. 25. December, 1892.—Texas soils: A study of chemical composition, analyses of samples from several geological formations of the State. Alkali spots. (A large number on hand.)

BULLETIN NO. 26. March, 1893.—Cost of cotton production and profit per acre. Results of economic tests by successful farmers of Texas. Reports of fertilizer tests by Station. (A large number on hand.)

NOTE.—The "Old Series" of Bulletins issued by the Agricultural Department of the College prior to the establishment of the Experiment Station in 1888, comprises: No. 1, Preliminary statements; No. 2, Pig feeding, tests of age and breed, dairy tests; No. 3, Effect of salt in pig feeding, notes on grasses; No. 4, Acclimating cattle (Texas fever); No. 5, Acclimating cattle, fertilizer tests, feeding cooked vs. uncooked food for cows and hogs.

Of these Nos. 2 and 4 are practically exhausted, but there is yet on hand a limited number, each, of Nos. 1, 3 and 5—*copies of which will be mailed on receipt of postage—one cent for each copy requested.*

COST OF CHEMICAL ANALYSES.

By order of the Board of Control, the Chemical Department is required to make a charge for analytical work that will cover cost of chemicals used, and probable expense resulting from breakage of apparatus employed in the work. No charge is made for time consumed when the work is of a public character and not for private profit. The Chemist may, at his discretion, do the work free of cost entirely.

The above provision made by the Board, does not apply to the analyses of drugs, patent medicines, poisons, or any work that is likely to assume legal importance.

Below is appended charges made for some of the more common substances that are frequently sent to the laboratory:

Soils	$6.00
Waters	6 00
Fertilizers	10 00
Ores—for each metal	1 00
Feed Stuffs	6 00

Prices for other analytical work will be furnished on application.

H. H. HARRINGTON,
Station Chemist.